

Remarks/Arguments:

Claims 1-16 are the pending claims in this application. Claims 7-15 are withdrawn. Claim 16 is new, and is supported, for example, at pg. 3, lines 6-8. No new matter has been added.

The specification is amended to correct a typographical error. As is evident throughout the specification, the corrected paragraph should have stated "the catalyst of the invention in which the ratio of base to acid is 0.67 . . . [and] the comparative catalyst in which the ratio of base to acid is 1.21." See Table 1 on pg. 10 showing Example 14 at 0.67 and Comparative Example 17 at 1.21. No new matter has been added.

Claims 1-6 stand rejected under 35 U.S.C. § 102 as anticipated by or alternatively under 35 U.S.C. § 103 as obvious over European Patent No. 0 812 818 (Ridland et al.). Applicants traverse these rejections and submit that the currently pending claims are patentable over these cited references for at least the reasons set forth below.

Rejections under 35 U.S.C. § 102

Claim 1 is not anticipated by Ridland because Ridland fails to expressly disclose a molar ratio of base to 2-hydroxy carboxylic acid of less than 0.8 : 1.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." M.P.E.P. §2131 *citing Verdegaa Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "[A]nticipation under § 102 can be found only when the reference discloses exactly what is claimed." See M.P.E.P. 2131.03 for discussion on anticipation of ranges (citing *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985)).

As is evident from the case law and clearly articulated in the M.P.E.P., prior art which teaches a range that is very close to, but does not overlap or touch the claimed range does not anticipate the claimed range.

Claim 1 recites, in part, "a catalyst in which the molar ratio of base to 2-hydroxy carboxylic acid is in the range 0.01 – 0.79 : 1."

Ridland discloses an amount of base in the range of 0.8 – 1.2 moles of base per mole of 2-hydroxycarboxylic acid or 1 – 3 moles per mole of acid when the acid is a tribasic acid, i.e., citric acid. Ridland page 3, lines 25 – 26.

Accordingly, the range of amounts of base as claimed does not touch or overlap with the range disclosed in Ridland. As Ridland fails to expressly disclose the claimed range, claim 1 is not anticipated.

Furthermore, the Office Action relies on Ridland for anticipating amounts below 0.8 at page 3, lines 23 – 25:

Frequently, the amount of base used is sufficient to fully neutralise the 2-hydroxy carboxylic acid but it is not essential that the acid is fully neutralised. Therefore, for monobasic 2-hydroxy acids such as lactic acid, the preferred amount of base is in the range 0.8 to 1.2 mole per mole of 2-hydroxy acid. In the case of citric acid (a tribasic acid), the preferred amount is in the range 1 to 3 moles base per mole of 2-hydroxy acid. (emphasis added).

This is not an express disclosure of a molar ratio of base to 2-hydroxy carboxylic acid of less than 0.8 : 1. Accordingly, the range of amounts of base as claimed does not touch or overlap with the range disclosed in Ridland. As Ridland fails to expressly disclose the claimed range, claim 1 is not anticipated. Claims 2-6 and 16 depend from claim 1, and are also not anticipated as dependent thereon.

Rejections under 35 U.S.C. § 103

Applicants respectfully submits that if a *prima facie* case of obviousness has been demonstrated, it has been rebutted because Applicants have demonstrated unexpected results in its Declaration of Calum Harry McIntosh pursuant to 37 CFR §1.132 (attached).

"To establish a *prima facie* case of obviousness, ... the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. §2143. A *prima facie* case of obviousness may exist where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See M.P.E.P. 2144.05 citing *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Cir. 1985). A *prima facie* case of obviousness may also be rebutted by showing unexpected results. See M.P.E.P 2144.05(III). "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or

other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

As explained in the Declaration of Calum Harry McIntosh pursuant to 37 CFR §1.132, unexpected properties were found in lowering the base to acid ratio as claimed. Most importantly, the thermal analysis demonstrated a significant and unexpected rise in crystallization temperature at the claimed range providing for a wider temperature window in processing the polyester. Also, Applicants discovered that localized concentrations of sodium and titanium were the source of breakage in the polyester fibers formed using the catalyst of Ridland.

First, the thermal analysis unexpectedly showed that polyester made using the catalyst according to the claimed invention showed an onset of crystallization higher than that of Ridland. See paragraphs 12 and 13 of the Declaration. Comparative Example 17 of the specification describes a catalyst preparation which is identical to the catalyst made in Example 5 of the Ridland reference. Example 20 in the specification then describes the preparation of polyethylene terephthalate (PET) using a catalyst made according to the invention (Example 14) and according to the prior art (Example 17), respectively. As shown in Table 4 and discussed in the specification at page 12, line 26 through page 13, line 2, the thermal behavior of the PET polymers made using the two catalysts differs, particularly in the crystallisation behavior. The PET made using the catalyst of Example 14 (according to an embodiment of the invention) shows a higher T_n and T_n than the PET made using the catalyst of Example 17 (Ridland). The significance of this difference is that the PET made using Example 14 (i.e., according to an embodiment of the invention) crystallises more slowly and so provides a wider range of temperatures for thermal processing operations, such as are used in making polyester films and bottles. This is a distinct and unexpected advantage provided by the catalysts of the claimed invention, which could not have been predicted from the Ridland reference. The skilled person could not have identified and solved the problem of providing polyester having a wider thermal processing window without inventive activity – i.e., determining the problem itself and finding the solution to it, which were not obvious in view of Ridland.

Second, Applicants discovered that localized concentrations of sodium and titanium were the source of breakage in the polyester fibers formed using the catalyst of Ridland. See paragraph 11 of Declaration. Applicants unexpectedly found that the amount of sodium in the original catalyst had caused processing problems in the polyester due to the amount of metal, e.g., sodium, present. In particular, localized concentrations of sodium and titanium were unexpectedly associated with the polyester at the break points. Recognizing this to be the cause of the problem, Applicants subsequently found that smaller amounts of base as are currently claimed produced a stable and active catalyst. Accordingly, the polyester fibers broke less often during processing using the catalyst of the claimed invention, than had occurred with catalysts using high levels of base.

Additionally, the Declaration also notes the added benefit of maintaining a hydrolytically stable, liquid catalyst composition (as opposed to a gel). See paragraphs 7-10 of the Declaration. As explained in the specification, a problem was found with the catalyst composition of Ridland, in that, when the alcohol, 1,4-butanediol, was used to make the catalyst, the composition formed a gel instead of a mobile liquid, as desired. See page 1, lines 20-23 of the specification. The use of the composition as currently claimed overcomes this problem as demonstrated in Examples 2 - 5 and compared with Comparative Example 1.

Accordingly, Applicants respectfully submit that if a *prima facie* case of obviousness has been demonstrated, it has been rebutted because unexpected results were found at the lower base to acid ratio as claimed. It is respectfully submitted that independent claim 1 is in condition for allowance. Claims 2-6 and 16 depend from claim 1 and therefore should each be allowed for at least the reasons set forth above.

Double Patenting

Claims 1-6 are provisionally rejected for nonstatutory obviousness-type double patenting as unpatentable over claims 1-12 of co-pending Application No. 10/432,510 and claims 14-22 of co-pending Application No. 10/574,976. Applicants respectfully submit that the claimed invention is patentably distinct over Application No. 10/432,510 and Application No. 10/574,976. Claim 1 recites a finite range of molar ratio of base to 2-hydroxycarboxylic acid, which is not claimed in either of the co-pending applications. Accordingly, Applicants request withdrawal of the provisional obviousness-type double patenting rejections.

Conclusion

For all of the foregoing reasons, Applicants respectfully request reconsideration and allowance of the claims. Applicants invite the examiner to contact their undersigned representative if it appears that this may expedite examination.

Respectfully submitted,



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Enclosures: Declaration of Calum Harry McIntosh and curriculum vitae

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The Director is hereby authorized to charge or credit Deposit Account No. 18-0350 for any additional fees, or any underpayment or credit for overpayment in connection herewith.

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